



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re U.S. Patent Application of:
Arana-Manzano et al.

Serial No. 09/608,051

Filed: 30 June 2000

For: **Ringback Detection Circuit**

Attorney Docket No. 4015-735

Walter F. Briney III
Examiner
Group 2644

Raleigh, North Carolina
1 September 2004

MS Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The present appeal brief is filed in triplicate pursuant to 37 C.F.R. § 1.192. Applicant also encloses a check in the amount of \$330.00 as required by 37 C.F.R. § 1.17(b).

APPEAL BRIEF

(1) REAL PARTY IN INTEREST

The real party in interest is Telefonaktiebolaget L.M. Ericsson, the Assignee of the present invention.

(2) RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences to the best of Applicants' knowledge.

09/07/2004 BABRAHA1 00000024 09608051

01 FC:1402

330.00 0P

(3) STATUS OF CLAIMS

Claims 1 – 31 were originally filed with the application. During the examination process, claims 19 – 23 were cancelled. Therefore, there are twenty-six (26) claims pending: claims 1 – 18 and 24 – 31. Accordingly, Applicants appeal the rejection of claims 1 – 18 and 24 – 31.

(4) STATUS OF AMENDMENTS

All amendments have been entered.

(5) SUMMARY OF INVENTION

The present invention comprises a method and apparatus to detect ringback in a received signal. The ringback detection device of the present invention comprises an energy calculator 102, a threshold calculator 104, and a comparator 106. The energy calculator 102 calculates the energy of the received signal, and the threshold calculator 104 calculates a ringback detection threshold based on the calculated energy. The comparator 106 then compares the calculated energy to the ringback detection threshold. When the calculated energy meets or exceeds the threshold, the comparator 106 generates a control signal indicating that ringback is present. Otherwise, the comparator 106 indicates that no ringback is present. (page 10, lines 6 – 18).

(6) ISSUES

Whether claims 1, 16, and 24 are anticipated under 35 U.S.C. §102(b) by Hinman (U.S. Patent No. 5,390,244).

Whether claims 5, 14, and 18 are obvious under 35 U.S.C. §103(a) over Hinman in view of Xie (U.S. Patent No. 5,588,053).

(7) GROUPING OF CLAIMS

The claims should be grouped as follows:

Group I: Claims 1 – 4, 6 – 14, and 15

Group III: Claims 5 and 18

Group II: Claims 16 – 17 and 24 – 31

(8) ARGUMENT

A. The law of Anticipation

Under 35 U.S.C. § 102, every element or limitation of a claim must identically appear in a single prior art reference for the reference to anticipate the claim. *In re Bond*, 910 F.2d 831, 323 (Fed. Cir. 1990). Further, anticipation requires that the single prior art reference disclose every element of the claimed invention arranged in the same manner as claimed. *Lindemann Maschinenfabrik v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458 (Fed. Cir. 1984).

In determining if a claim is anticipated, it is fundamental that the claim first be correctly construed. That is, the scope and meaning of each contested limitation must be determined. *Gechter* at 1457; *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994). Thereafter, corresponding elements of the allegedly anticipating reference are identified. *Lindemann* at 1458. In the end, there can be no anticipation unless each and every element and limitation of the claimed invention, as properly construed, is found in the single prior art reference.

B. Claim 1 is not anticipated by Hinman.

Claim 1 is as follows (emphasis added):

1. A method for detecting ringback in a received signal, said method comprising:
 - a. calculating the energy of said received signal;
 - b. calculating a threshold based on said energy in said received signal;

- c. determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold; and
- d. outputting a control signal indicating whether ringback is present in said received signal.

The first step of claim 1 requires “calculating the energy of said received signal.” The straightforward wording of this claim limitation clearly requires the direct calculation of the received signal energy. Figures 2 and 3 of the instant application support this interpretation. As such, the energy calculation step of claim 1 cannot be interpreted to include calculating the energy of other signals present in the communication terminal, even if the other signal(s) indirectly relate to the received signal energy. Instead, the energy calculation step of claim 1 can only be interpreted as the direct calculation of the energy in the received signal.

The second step of claim 1 requires “calculating a threshold based on said energy in said received signal” (emphasis added). Again, this step is straightforward and clearly requires that the calculated threshold must be directly based on the received signal energy calculated in step 1. Figure 3 and page 10, lines 8 – 10 support this interpretation. As such, the threshold calculated in claim 1 cannot be interpreted to include calculating a threshold based on the energy of other signals present in the communication terminal, even if these other signal(s) indirectly relate to the received signal energy.

The third and fourth steps of claim 1 require “determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold; and outputting a control signal indicating whether ringback is present in said received signal.” Here, the plain language of the claim requires that the received signal energy calculated in step 1 be compared to the threshold calculated in step 2. Based on this comparison, the communication

terminal determines if ringback is present and outputs a control signal indicative of this determination.

1. The Examiner misconstrues claim 1.

a. The Examiner gives an overbroad construction to “calculating the energy of the received signal.”

The ringback detection method of claim 1 directly relates to the calculated energy of the signal received by the communication terminal. As discussed above, this calculated energy is the result of a direct calculation of the energy in the received signal. Contrary to this interpretation, the Examiner contends that the broadest reasonable interpretation of the calculated energy of claim 1 includes Hinman’s calculation of autocorrelation energy. This interpretation is overly broad and cannot withstand scrutiny.

As well understood by those skilled in the art, autocorrelation involves nothing more than comparing a time-shifted copy of a received signal to the original received signal. One of the more interesting points about autocorrelation is that it evaluates the periodicity of a signal, and not the actual energy of the signal. Therefore, while the autocorrelation energy of Hinman is directly related to the periodicity of the received signal, the autocorrelation energy is, at best, only indirectly related to the received signal energy. Because the plain language of claim 1 requires the direct calculation of the received signal energy, the interpretation imposed by the Examiner is unreasonably broad.

b. The Examiner gives an overbroad construction to “calculating a threshold based on said energy of said received signal.”

The Examiner equates the energy threshold calculated in claim 1 with an autocorrelation threshold described in Hinman. As discussed above, the threshold calculated in step 2 of claim 1

is directly based on the received signal energy. Contrastingly, the Examiner asserts that an autocorrelation threshold calculated based directly on a microphone input is equivalent to the energy threshold of claim 1 because echo present in the microphone input is related to the received signal energy.

This interpretation is in error. As those skilled in the art understand, echo signals present in the microphone input change as the environment of the communication terminal changes. For example, the echo signals produced in a moving car differ from the echo signals produced in a building, even if the received signal in both situations is identical. As a result, calculating a threshold based on a microphone input that includes echo signals will not produce the same threshold result as calculating a threshold based on the received signal energy. Therefore, even when echo is present, the microphone input cannot be interpreted as being directly related to the received signal energy. At best, the microphone input is indirectly and indeterminately related to the received signal energy. Because the plain language of claim 1 requires calculating the threshold based directly on the received signal energy, the interpretation imposed by the Examiner is overly broad.

c. The Examiner gives an overbroad construction to “comparing said energy in said received signal to said threshold.”

Claim 1 also requires “determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold.” Because the Examiner misinterprets the threshold calculation limitation of claim 1, the Examiner necessarily misinterprets “comparing said energy in said received signal to said threshold.” As discussed above, the comparing limitation can only be interpreted as comparing the energy calculated in step 1 to the threshold calculated in step 2. Therefore, contrary to the Examiner’s assertions,

comparing calculated received signal energy to a threshold directly calculated based on the received signal energy is not equivalent to comparing an autocorrelation energy to an autocorrelation threshold indirectly calculated based on the received signal.

d. The Examiner uses multiple definitions of “signal energy” throughout the rejection.

In addition to the above remarks, it should be noted that while claim 1 claims calculating and using a single received signal energy throughout the claim, the Examiner’s interpretation of claim 1 uses different definitions for the calculated signal energy when applied to different elements of the claims. As shown on page 2, lines 17 – 18 of the Advisory action, the Examiner initially asserts that the received signal energy calculated in step 1 broadly corresponds to Hinman’s results obtained from time-shifted autocorrelation coefficients obtained from a received signal (see below discussions for further details). The Examiner employs this same definition when interpreting the comparison limitation. However, when interpreting the threshold calculation limitation, the Examiner equates the received signal energy to a microphone input energy (see page 3, lines 6 – 9, of the Advisory Action). Because claim 1 requires that the signal energy used to calculate the threshold be the same signal energy that is compared to the threshold, the Examiner’s interpretation cannot be maintained. As a result, the Board must reverse the rejection of claim 1.

2. The Examiner misinterprets Hinman.

a. The Examiner incorrectly concludes that the ringback detection method of Hinman is based on the energy of the received signal.

As discussed above, the ringback detection process of claim 1 explicitly requires comparing the received signal energy to an energy-based threshold. If the received signal energy

meets or exceeds the threshold, ringback is detected. Otherwise, ringback is not detected. The Examiner asserts that, like the present application, Hinman calculates a ringback detection threshold based on the received signal energy. Further, the Examiner asserts that, like the present application, Hinman detects ringback by comparing the received signal energy to a threshold that is based on the received signal energy. As discussed further below, this interpretation of Hinman is wrong.

b. Hinman's ringback detection method is based on an autocorrelation process, not on the energy of the received signal.

Claim 1 explicitly teaches a method of ringback detection based on comparing a calculated energy of the received signal to an energy threshold. Contrastingly, Hinman teaches a method for detecting ringback based on comparing summed autocorrelation coefficients to an autocorrelation threshold. These are fundamentally different approaches. In fact, as discussed further below, Hinman's ringback detection process is independent of the received signal energy.

Hinman detects ringback in a received signal by identifying that the received signal includes one or more periodic components. More particularly, Hinman detects ringback (and other periodic content) in the received signal by autocorrelating the received signal with time-shifted versions of the received signal. As understood by those skilled in the art, autocorrelation involves nothing more than comparing a time-shifted copy of a signal to the original signal. When the time-shift comprises a zero time shift, the resulting autocorrelation coefficient $R_{(0)}$ is simply the comparison of the original signal with a copy of itself. As is well understood in the art, this non-shifted autocorrelation coefficient is related to the received signal energy and therefore, may be used to calculate the received signal energy. However, those skilled in the art also appreciate that the same cannot be said for the autocorrelation coefficients generated using

the non-zero time-shifts ($R_{(1)} - R_{(10)}$). Instead, the non-zero time-shifted autocorrelation coefficients are used to evaluate the autocorrelation behavior of the received signal. Hinman uses $R_{(1)} - R_{(10)}$ to detect ringback.

As discussed above, the autocorrelation behavior depends on the periodicity of a received signal, not on the actual energy of the received signal. As such, the time-shifted autocorrelation coefficients of Hinman are nothing more than periodicity indicators used to evaluate the periodicity of the received signal. It is well understood by those skilled in the art that a periodic signal will exhibit a high autocorrelation response, while a non-periodic signal will exhibit a low autocorrelation response. It is also well understood by those skilled in the art that a low energy periodic signal will exhibit a high autocorrelation response, while a high energy non-periodic signal will exhibit a low autocorrelation response. As such, autocorrelation is largely independent of the actual received signal energy.

In fact, to ensure that the autocorrelation process is independent of the received signal energy, Hinman removes the effects of the received signal energy from the time-shifted autocorrelation coefficients by normalizing the time-shifted autocorrelation coefficients $R_{(1)} - R_{(10)}$ using the zero-shifted autocorrelation coefficient $R_{(0)}$ (see column 5, lines 35 – 47). As described in column 5, lines 47 – 55, Hinman takes the absolute value of each normalized time-shifted autocorrelation coefficient and sums them together to generate a figure of merit (the autocorrelation energy) representative of the periodicity of the received signal independent of the received signal energy. Because the figure of merit is independent of the received signal energy, the ringback detection method described in Hinman is wholly different from the energy-based ringback detection method of claim 1, and Hinman thus cannot stand as an anticipating reference.

c. Contrary to the Examiner's assertions, Hinman does not calculate a threshold.

Claim 1 requires "calculating a threshold based on said energy in said received signal."

However, contrary to the Examiner's assertions, the threshold of Hinman is not calculated at all. Instead, the threshold is experimentally derived (column 5, lines 59 – 60). More particularly, as described in column 6, lines 28 – 34:

Determination of the proper threshold for use in step 64 is made by applying various common periodic and speech signals to the A/D converter 23 and the threshold value is adjusted to optimize the ERLE measurement. For example, in the preferred embodiment where $R(0)$ is set to a value of "1", the preferred threshold is set to 0.5.

Clearly, the Hinman threshold is not calculated, but instead is derived through trial and error. As a result, the Examiner's assertion that Hinman teaches calculating a threshold is in error and cannot be maintained.

d. Hinman's ringback detection threshold varies based on the performance of the echo-canceling filters, not based on the energy of the received signal.

Even if the experimental derivation of the Hinman threshold could be interpreted as a calculation, the Hinman threshold does not vary based on the received signal energy, which is contrary to the requirements of claim 1. Instead, the threshold of Hinman is derived based on the performance of an echo-canceling filter, which is independent of the received signal energy.

Hinman assesses the performance of the echo-canceling filter by evaluating the filter's Echo Return Loss Enhancement (ERLE). The ERLE represents the filter's effectiveness at suppressing echo components from the speakerphone's microphone input signal by comparing the filter input to the filter output (see Figure 2 and column 6, lines 5 – 27). It is important to note that when performing perfectly, the filter yields a zero-ERLE irrespective of the received signal energy and irrespective of how much echo is present in the microphone input.

When the ERLE indicates that the filter is performing poorly, Hinman infers that the poor performance is a result of a failure to detect ringback, which in turn results in a failure to freeze filter adaptation during ringback. Because the reliability of Hinman's ringback detection is based on the autocorrelation threshold level, Hinman infers that a failure to detect ringback indicates that the autocorrelation threshold is not set at an appropriate level. Thus, Hinman uses the ERLE as an indirect mechanism to determine if the autocorrelation threshold is set at an appropriate level, and makes threshold adjustments accordingly in the hope of improving ringback detection reliability. In other words, contrary to the Examiner's assertions, Hinman modifies the ringback detection threshold directly and solely based on the performance of the echo-canceling filter, and not on the received signal energy.

3. The Examiner's anticipation rejection is based on the incorrect interpretation of Hinman, and therefore, cannot be maintained.

a. A careful evaluation of the Examiner's anticipation rejection reveals that the Examiner does not understand the fundamental operation of Hinman.

In the Advisory Action, the Examiner asserts that summing the absolute value of normalized versions of the time-shifted autocorrelation coefficients generates an energy equivalent to the energy of the received signal. Specifically, on page 2 of the Advisory Action dated 9 June 2004, the Examiner asserts:

the autocorrelation function disclosed by Hinman is fully dependent on the energy of the received signal. As evidence, Hinman discloses an autocorrelation coefficient $R_{(0)}$ (column 4, equation 1). It is a typical energy measurement. The examiner has interpreted the other autocorrelation coefficients as time shifted energy measurements because an absolute value function is applied to them (column 5, lines 47-49). If the received signal was static, the level of each coefficient would be the same, however, a periodic signal (e.g. ringback) will reflect a discernible pattern. The summation of these energy measurements provides the energy of the received signal of the claim.

This interpretation of Hinman is wrong. In fact, this interpretation indicates that the Examiner completely misunderstands Hinman.

First, the Examiner asserts that “static” signals have the same autocorrelation for all time offsets. The phrase “static signals” is interchangeable with “DC signals.” However, the communication terminals of Hinman and the instant application do not receive DC signals. Instead, the received signals always vary with time. As a result, it is pointless to even speculate how the autocorrelation process taught by Hinamn may respond to “static” signals.

Secondly, the Examiner asserts that Hinman detects periodic signals by recognizing a periodic pattern in the calculated autocorrelation coefficients. However, contrary to the Examiner’s assertions, autocorrelation processing is not used to locate or identify “discernible patterns” in the received signal. Instead, the autocorrelation process of Hinman simply sums the autocorrelation coefficients and compares the sum to a threshold. “Patterns” have nothing to do with the process.

Lastly, the value of each time-shifted autocorrelation coefficient $R_{(x)}$ depends on whether a time-shifted copy of the received signal matches the original received signal, and not on the energy of the original received signal. Generally, a high autocorrelation coefficient occurs when a high degree of similarity exists between the time-shifted copy and the original received signal. As understood by those skilled in the art, the amount of energy in the received signal or in the time-shifted copy of the received signal has no impact on how well the time-shifted copy matches the original received signal. As such, time-shifted autocorrelation coefficients cannot be interpreted as time-shifted energy measurements.

In light of the above, it is clear that the Examiner does not understand Hinman. Further, the Examiner’s misunderstanding of Hinman infects his entire basis for rejecting the instant

application. Because all of the rejections are based on the Examiner's faulty understanding of Hinman, the rejections are flawed and must be reversed.

b. Contrary to the Examiner's assertions, the autocorrelation energy of Hinman is not equivalent to the received signal energy of claim 1.

The Examiner argues that the autocorrelation energy calculated in Hinman is the same as the received signal energy calculated in claim 1. In particular, the Examiner asserts that a time-shifted autocorrelation coefficient, or the sum of multiple time-shifted autocorrelation coefficients, is a measure of the energy of the received signal. As discussed above, this assertion is contrary to the universally held understanding of autocorrelation. Further, this assertion is contrary to the teachings of Hinman. Therefore, the autocorrelation energy of Hinman cannot be interpreted as the received signal energy.

c. Contrary to the Examiner's assertions, the autocorrelation threshold of Hinman is not equivalent to the threshold of claim 1.

As shown above, the Examiner argues that Hinman's autocorrelation threshold is adjusted based on the received signal energy. In particular, the Examiner asserts that because the autocorrelation threshold of Hinman is varied responsive to the ERLE and because the ERLE depends on the microphone input, the autocorrelation threshold is varied responsive to the microphone input. As a result, the Examiner concludes that the presence of echoed received signals in the microphone input makes the autocorrelation threshold responsive to the received signal energy. However, as discussed above, the ERLE varies independently of the received signal energy. As a result, the autocorrelation threshold of Hinman is not based on the received signal energy.

4. As correctly construed, Hinman does not anticipate claim 1.

As discussed above, Hinman does not calculate a threshold based on a calculated energy of the received signal, as required by claim 1. Further, Hinman does not compare the calculated energy of the received signal to the energy threshold to determine if ringback is present, as required by claim 1. For at least these reasons Hinman does not anticipate claim 1 and the rejection must be reversed.

C. Claims 16 and 24 are not anticipated by Hinman.

Claim 16 is as follows (emphasis added):

16. A ringback detector comprising:
- a. an energy calculator to calculate the energy of a received signal;
 - b. a threshold calculator to calculate a ringback threshold based on said calculated energy of said received signal;
 - c. a comparator to compare said calculated energy of said received signal to said ringback threshold and to generate a control signal indicative of ringback based on said comparison.

Claim 24 is as follows (emphasis added):

24. A communications terminal comprising:
- a. a receiver for receiving signals transmitted from a remote location;
 - b. an audio processing circuit to process audio signals contained in said received signal; and
 - c. a ringback detector to determine whether ringback is present in said received signal, said ringback detector including:
 1. an energy calculator to calculate the energy of a received signal;
 2. a threshold calculator to calculate a ringback threshold based on said calculated energy of said received signal;
 3. a comparator to compare said calculated energy of said received signal to said ringback threshold and to generate a control signal to control said audio processing circuit.

Claims 16 and 24 are apparatus claims that embody a method similar to claim 1. Both claims 16 and 24 include an energy calculator, a threshold calculator, and a comparator. During prosecution, the Examiner simply stated that “claims 16 and 24 are essentially the same as claim 1 and their rejections are maintained for the same reasons as claim 1” (Advisory Action, page 3). Because the Examiner used the same rejection applied to claim 1 to reject claims 16 and 24, the same arguments presented above are equally applicable. More specifically, as with method claim 1 discussed above, the Examiner misinterprets the calculated signal energy, calculated threshold, and comparison limitations associated with the energy calculator, the threshold calculator, and the comparator, respectively. In addition, the Examiner misinterprets Hinman as discussed above. Therefore, the rejection is flawed and must be withdrawn.

Further, the Examiner completely ignores the fact that Hinman does not include the energy calculator, the threshold calculator, or the comparator of claim 1. For example, as discussed above, the autocorrelation energy calculated by Hinman is wholly different from the received signal energy calculated by the energy calculator of claim 1. As such, Hinman does not teach the energy calculator of claim 1. Similarly, while Hinman compares autocorrelation energy to an autocorrelation threshold, Hinman does not compare the received signal energy calculated by the energy calculator to the threshold calculated by the threshold calculator. Therefore, Hinman does not teach the comparator of claim 1. In addition, because Hinman does not even calculate a threshold, Hinman necessarily does not include a threshold calculator. For at least these reasons, Hinman cannot anticipate claims 16 and 24.

D. Claim 5 is not obvious over Hinman in view of Xie.

Claim 5 is as follows:

5. The method of claim 4 further including maintaining said control signal in said second state for a predetermined period of time after ringback is no longer detected before changing to said first state.

Claim 5 indirectly depends from claim 1 and expands upon the control signal limitation of claim 1. As described in the present application and claimed in claims 1 and 2 – 4, the control signal operates as a ringback indicator for the echo-cancellation process. More specifically, the first state of the control signal indicates that ringback is not present while the second state of the control signal indicates that ringback is present. Therefore, when ringback is detected, the control signal changes from the first state to the second state. When ringback is no longer detected, the control signal reverts back to the first state. However, to smooth the transition from the second state to the first state, the control signal may be maintained in the second state a predetermined period of time after ringback is no longer detected. Claim 5 explicitly claims this time delay.

In order for the Examiner to issue a §103 rejection, the Examiner must show that (1) the prior art would motivate one of ordinary skill in the art to select the cited references and combine them as stated by the Examiner and (2) the primary reference (Hinman), as modified by the secondary reference (Xie) includes each and every limitation of the claim. In setting forth a factual basis for motivation, the Patent Office must go beyond mere broad conclusionary statements and set forth specific understandings or technical principles that would motivate a person of ordinary skill in the art to make the combination that would render the combination obvious. *In re Dembizak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

Xie describes a method and apparatus for detecting Dual Tone Multi-Frequency (DTMF) signals. As described in column 1, lines 23 – 34, DTMF signals are used to transmit a phone number or the like from a push-button telephone to a telephone central office. According to Xie,

a received signal $x[n]$ must pass multiple threshold tests as well as a guard time check to ensure valid detection of a DTMF signal. The threshold tests evaluate various energy values associated with the received signal to make sure that the energy values meet basic DTMF energy criteria (column 8, lines 2 – 8). The guard time check evaluates the length of the received signal to ensure that the received signal is of sufficient length to be a DTMF signal (column 8, lines 16 – 18; column 18, lines 20 – 22). It is important to note that Xie is completely unrelated to ringback detection.

In rejecting claims 5 and 18, the Examiner asserts:

Xie teaches an enhanced guard-time check unit (figure 2, element 136) that fails tone detection when a signal is not present for two sample periods (i.e. predetermined period of time) for purpose of reducing false tone detection (i.e., ringback) (column 17, line 28 – column 18, line 31). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the guard-time check unit as taught by Xie in conjunction with the tone detection algorithm of Hinman for the purpose of reducing false tone detection.

The Examiner's proffered motivation to combine is conclusory at best. As stated above, such conclusionary statements cannot withstand scrutiny. There is nothing in Xie to support the idea that the guard-time check unit 136 may be used to reduce false detection of ringback. In fact, there is nothing in Xie that even discusses ringback or ringback detection. The sole purpose of the guard-time check unit of Xie is to determine if the received signal is long enough to be a DTMF signal. Because Xie is completely unrelated to ringback detection, Xie is also unrelated to the ringback detection of Hinman. Therefore, a person skilled in the art would not be motivated to combine Xie with Hinman. For at least this reason, the Examiner's rejection must be reversed.

Further, even if Xie was combined with Hinman, the combination does not teach the claimed invention. First, as discussed above, the guard-time check unit of Xie determines that a DTMF signal is not present unless the duration of the received signal satisfies the requirements of the guard-time check unit. Contrary to the Examiner's assertions, determining if the length of a signal satisfies a duration requirement is wholly different from maintaining a system in a second state for a predetermined period of time after ringback is no longer detected before changing back to the first state, as required by claim 5. Because Xie does not teach the specific limitation of claim 5, and because Hinman does not include any type of time check, claim 5 is non-obvious in view of Xie and Hinman.

Second, as discussed above, Hinman does not teach the limitations of the claims from which claim 5 depends (calculating a threshold based on said energy in said received signal and determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold). Because Xie does not solve these defects, the combination of Xie with Hinman cannot render claim 5 obvious.

E. Claim 18 is not obvious over Hinman in view of Xie.

Claim 18 is as follows:

18. The ringback detector of claim 17 further comprising a hang-time element to delay for a predetermined period after ringback is no longer detected the change of said control signal from said second state indicative of ringback to said first state indicative of no ringback.

Claim 18 is an apparatus claim corresponding to method claim 5. The Examiner rejected claim 18 for essentially the same reasons applied to claim 5. First, as discussed above with respect to claim 5, there is no motivation to combine Xie with Hinman. Second, the hang-time element of claim 18 is a device that delays the change of the control signal after ringback is no

longer detected. Contrastingly, the guard-time check unit of Xie is a device that measures the length of a received signal to determine if the measured length meets basic signal length requirements. Because the hang-time element of claim 18 is different from the guard-time check unit of Hinman, claim 18 is not obvious over the combination of Hinman with Xie. For at least these reasons, the rejection must be reversed.

(9) CONCLUSION

For the above stated reasons, claims 1 – 18 and 24 – 31 define patentable subject matter over the cited art. Accordingly, Applicants request that the Board of Patent Appeals and Interferences reverse the Examiner and find that claims 1 – 18 and 24 – 31 are patentable.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

By:



Jennifer K. Stewart
Registration No. 53,639

P.O. Box 5
Raleigh, NC 27602
Telephone: (919) 854-1844

CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS DOCUMENT IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL, POSTAGE PREPAID, IN AN ENVELOPE ADDRESSED TO: MS Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

SIGNATURE _____



DATE _____

9/1/04

(10) APPENDIX

Claims on Appeal

1. A method for detecting ringback in a received signal, said method comprising:
 - a. calculating the energy of said received signal;
 - b. calculating a threshold based on said energy in said received signal;
 - c. determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold; and
 - d. outputting a control signal indicating whether ringback is present in said received signal.
2. The method of claim 1 further comprising setting said threshold to an initial value at the start of a call and adjusting said threshold upwardly based on said energy of said received signal.
3. The method of claim 1 wherein outputting a control signal comprises changing said control signal to a first state indicative of no ringback to a second state indicative of ringback when ringback is detected.
4. The method of claim 3 wherein changing said control signal further comprises changing said control signal from said second state indicative of ringback to said first state indicative of no ringback when ringback is no longer detected.
5. The method of claim 4 further including maintaining said control signal in said second state for a predetermined period of time after ringback is no longer detected before changing to said first state.

6. The method of claim 1 further comprising using said control signal to control an audio processing circuit.
7. The method of claim 6 wherein using said control signal to control an audio processing circuit comprises freezing an adaptive algorithm within said audio processing circuit when ringback is detected.
8. The method of claim 7 wherein said adaptive algorithm is a voice activity detector.
9. The method of claim 7 wherein said adaptive algorithm is an acoustic echo canceller.
10. The method of claim 7 wherein said adaptive algorithm is a network echo canceller.
11. The method of claim 7 wherein said adaptive algorithm is a noise estimator.
12. The method of claim 7 wherein said adaptive algorithm is a channel gain estimator.
13. The method of claim 7 wherein said adaptive algorithm is a noise suppressor.
14. The method of claim 5 wherein using said control signal to control an audio processing circuit comprises changing the operating mode of said audio processing circuit.
15. The method of claim 14 wherein said audio processing circuit is a residual echo suppressor and whereon said control signal is used to place said residual echo suppressor in a bypass mode.

16. A ringback detector comprising:
- a. an energy calculator to calculate the energy of a received signal;
 - b. a threshold calculator to calculate a ringback threshold based on said calculated energy of said received signal;
 - c. a comparator to compare said calculated energy of said received signal to said ringback threshold and to generate a control signal indicative of ringback based on said comparison.
17. The ringback detector of claim 16 wherein said control signal output from said comparator assumes a first state indicative of no ringback when ringback is not detected and assumes a second state indicative of ringback when ringback is detected.
18. The ringback detector of claim 17 further comprising a hang-time element to delay for a predetermined period after ringback is no longer detected the change of said control signal from said second state indicative of ringback to said first state indicative of no ringback.
24. A communications terminal comprising:
- a. a receiver for receiving signals transmitted from a remote location;
 - b. an audio processing circuit to process audio signals contained in said received signal; and
 - c. a ringback detector to determine whether ringback is present in said received signal, said ringback detector including:
 1. an energy calculator to calculate the energy of a received signal;

2. a threshold calculator to calculate a ringback threshold based on said calculated energy of said received signal;
 3. a comparator to compare said calculated energy of said received signal to said ringback threshold and to generate a control signal to control said audio processing circuit.
25. The communications terminal of claim 24 wherein said audio processing circuit includes a voice activity detector.
26. The communications terminal of claim 24 wherein said audio processing circuit includes an acoustic echo canceller.
27. The communications terminal of claim 24 wherein said audio processing circuit includes a network echo canceller.
28. The communications terminal of claim 24 wherein said audio processing circuit includes a noise estimator.
29. The communications terminal of claim 24 wherein said audio processing circuit includes a channel gain estimator.
30. The communications terminal of claim 24 wherein said audio processing circuit includes a noise suppressor.

31. The communications terminal of claim 24 wherein said audio processing circuit includes a residual echo suppressor.